ARAT BULLETIN

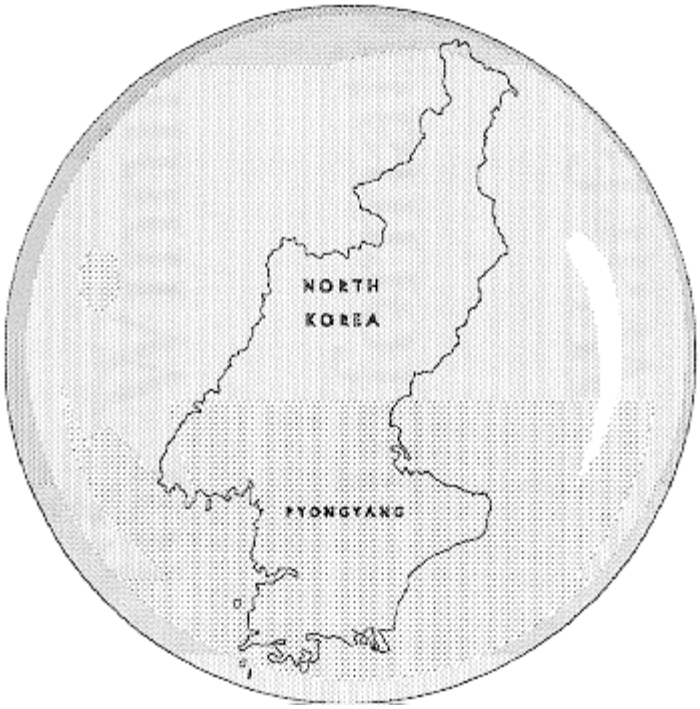
Published by ATRR-PO
Fort Monmouth, NJ 07703

Volume 1, Issue 2 **July 1994**

DO YOU KNOW ENOUGH ABOUT ARAT TO MEET YOUR RAPID REPROGRAMMING REQUIREMENTS?

(Make Future Performance Of Your ATSS Predictable!)

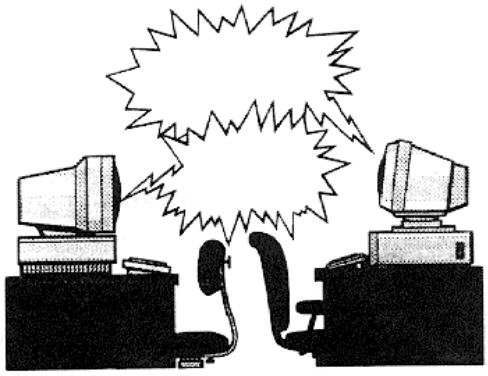
What's Inside:



ARAT BBS: "It's Up & Running"

(First in a series of articles)

New tools which help support rapid reprogramming efforts within the United States Army are continually coming into use. One example is the ARAT (Army Reprogramming Analysis Team) Bulletin Board System (BBS). The BBS, currently operational, is a dedicated data information system designed to support data transfer and E-mail between remote subscribers. The host computer is located at the United States Air Force (USAF) Air Warfare Center (AWC), Eglin Air Force Base (AFB). The libraries and architecture are also maintained and backed up on equipment at this location.



During the Gulf War, AWC and ARAT-TA (Army Reprogramming Analysis Team - Threat Analysis) personnel experienced difficulty communicating with deployed units to relay threat and software information. Although American military units in Saudi Arabia and elsewhere could always reach the AWC and ARAT-TA by telephone, they could not be readily accessed through servicing area communications. In response, the USAF successfully introduced a BBS to provide a real time bridge. Reprogramming exercises in 1993 and 1994 have verified the BBS proof of principle. Now, the three Services, Army, Air Force, and Navy, use a BBS as either a primary or back-up means to transmit reprogramming information to the field.

The ARAT BBS is one of several systems which allow dissemination of reprogramming data to a wide audience in near real time. It uses Galacticom 6.1 BBS software. It is accredited at the SECRET level and is a communications tool designed to provide electronic combat information to the Army electronic community on a "pull" basis. "Pull" simply means that you call to retrieve the desired information. The 68th Electronic Combat Group (USAF) maintains the BBS with ARAT-TA personnel performing Army system administration between individuals or groups.

The BBS has several services available to users. These include access to current threat data which may impact operational systems; validation of identified threat signature changes by the appropriate Commander-In-Chief (CINC); tactics, techniques and procedure assessments for new or modified threats as determined by the appropriate center or school; technical impact assessments and reprogramming schedules; reprogramming message templates; and secure E-Mail and forums for the exchange of electronic combat information between users in the ARAT community.

The BBS provides three options to the user: a registry, E-Mail and libraries. The registry provides a listing of BBS users. Only the E-Mail and the libraries can be accessed by all users. Other files, partitioned by equipment designation, are accessed on a need-to-know basis. For example, if an aviator in the field uses an APR-39A (V) 1, the library for that system can be accessed due to an established need-to-know. The

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BBS (continued)

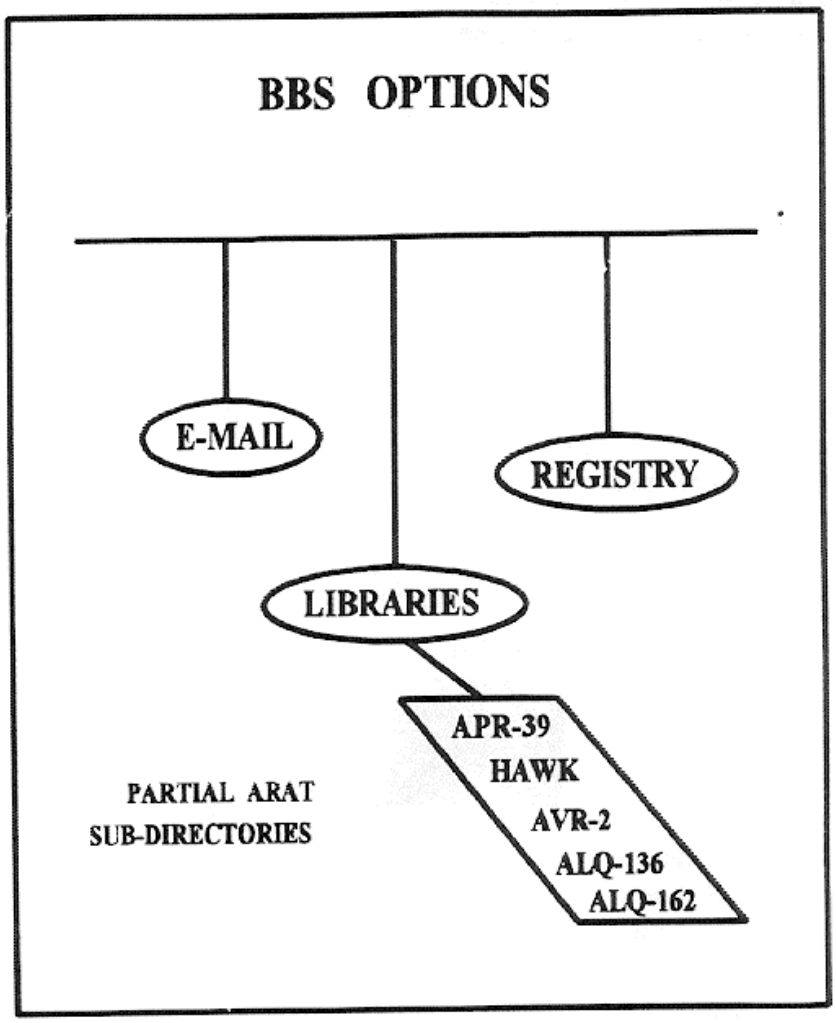
Communications-Electronics Command (CECOM) library, however, can only be accessed by the ARAT-TA engineers at Eglin AFB along with the CECOM engineers. It is a technical library which is of little use to the field operators. Currently, there are 21 libraries in the BBS. These are partitioned into equipment designators such as:

AN/ALQ-136 (V) 2
HAWK
ALQ-162 (V) 2
AVENGER
AN/APR-39A (V) 1
AN/APR-39 (V) 2

The BBS is designed so that classified information can be accessed or passed between users once an account has been established with the System Operators (SYSOPS) at Eglin AFB. This is accomplished by contacting Norm Svarrer or George Williamson, the SYSOPS, at the following numbers: Commercial (904) 882-8899/8919 or DSN 872-8899/8919. They will provide you with a "sign on" package.

You must complete the instructions in the package and assemble all equipment. Settings for interconnection between your computer and the Secure Telephone Unit (STU-III) are provided in the "sign on" package. Each model of the STU-III has different operating instructions. It is critical to follow these operating instructions for interconnection to the BBS. After you are officially loaded into the software on the host computer at Eglin AFB, you must initially sign onto the BBS as a new user. At this time, you will enter the password assigned. You will then be logged onto the system. You should also log yourself into the registry of users at this time so that others can find you and your organization.

So far, we have introduced you to the BBS and provided a general overview. In upcoming articles, we will provide more detailed information on communications protocols and the upload/ download of files to the E-Mail. POCs are Mr.Norm Svarrer, DSN: 872-8899/Mr. Anthony Munoz, DSN: 992-1337.



Formatted Messages Speed Rapid Reprogramming Support

(First In A Series Of Articles)

As technology evolves, more reprogrammable Army Target Sensing Systems (ATSS) will be modified and/or added to the Army inventory. As this occurs, the ability to perform rapid reprogramming will become more critical. One key to success is possessing the ability to conduct automated message processing. Without standardized message formats, automation of message processing cannot be reasonably accomplished due to the growing prevalence and complexity of ATSS on the battlefield; increasing numbers of databases which must be maintained to accommodate the variety of ATSS; and the massive volume of message traffic (reprogramming and non-reprogramming related) generated during crisis or conflict.

The U.S. Navy (USN) and U.S. Air Force (USAF) have both made considerable progress in developing standard rapid reprogramming procedures. These are designed to efficiently support deployed Electronic Warfare (EW) systems by ensuring timely and operationally responsive changes to tactical libraries are available for a constantly changing threat environment. The Army standardization effort began with investigation of the existing approaches to rapid reprogramming in use with the Air Force and Navy. This was followed by extensive research of existing documentation regarding military message procedures and Army doctrine.

The objectives of this research were to identify compatibility, recommend changes and modifications, and/or develop new message formats suitable for the requirements of the Army reprogramming effort. Research indicated that current Army doctrine and message formats did not adequately address requirements. In addition, neither Air Force nor Navy models standing alone were able to meet Army requirements. Research also indicated that a variation of these approaches is needed to fit the unique rapid reprogramming architecture of the Army as well as incorporate lessons learned from BRAVE BYTE exercises.

Tracking reprogramming information/data is critical to system and unit readiness. The numbering schemes offered by the USAF and USN highlight two important aspects of any message procedures determination. These are: "How messages are tracked" and "How a field unit checks for applicable messages". The Navy serializes messages using a calendar year prefix and a sequential numbering system. The Air Force incorporates sequential numbering but applies it directly to the type of message and includes the identifier for the message originator. This scheme (Air Force) also includes the EW equipment type/designation which makes it easy for field units to search for applicable messages.

The Army (Target Sensing Systems) Rapid Reprogramming Project Office (ARAT-PO), located at Fort Monmouth, has begun developing reprogramming-related message formats. The objectives driving standardization of message formats are to produce messages that are both human-readable and machine-processable; reduce time and effort required to draft, transmit, analyze, interpret, and process rapid reprogramming messages; improve information exchange through vocabulary control; and provide reporting procedures for all defense conditions.

Army objectives in the recently completed BRAVE BYTE 94 exercise included evaluating the utility of standardized message templates. Four developmental message templates were

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Message Processing (continued)

used during the course of the exercise. These templates conformed to three of the four steps involved in rapid reprogramming: Determine the Threat - a Threat Impact Message (TIM); Determine the Response - a Reprogramming Impact Message (RIM); and Create the Change - a Software Request Message (SCR) and Data Message (DM). The fourth step, Implementing the Change, was not part of this exercise.

Messages were transmitted via general purpose communications and posted to the recently installed ARAT BBS. Although Lessons Learned have only recently been submitted, the necessity of standardized message formats was demonstrated during the initial phases of BRAVE BYTE 94.

A considerable amount of work remains in order for the Army to achieve message format standardization. BRAVE BYTE 94 served to confirm the Army's need for message format standardization. Future articles will discuss electronic generation of messages, what triggers messages, who prepares messages, and lessons learned from BRAVE BYTE 94 (to include problems identified and possible solutions). POCs are Mr.Ken Kragh/Mr. Gary Parker, DSN: 992-6003.

ARAT-PO BRIEFS OLD CROWS CONFERENCES

The ARAT-PO recently presented two briefings to the Association of Old Crows (AOC). LTC Robert Morton, (HQDA, DAMO-FDI) addressed the National Chapter Conference while Mr. Sok Kim (ARAT-PO) talked to the Garden State (NJ) Chapter, at Washington, DC and Ft. Monmouth, respectively. The briefings provided overviews of ARAT program progress and included key issues currently under exploration. The ARAT-PO uses conferences such as this to maintain an open forum with all service branches and throughout the defense industry. POCs are Mr. Sok Kim/Mr. Ray Johnson, DSN: 992-1337.

OPERATIONS PROVIDE PROMISE /DENY FLIGHT

The Army Reprogramming Analysis Team - Threat Analysis (ARAT-TA) is presently providing threat analysis support for Operations Provide Promise/Deny Flight in Bosnia. Threat analysis personnel, located at Eglin Air Force Base, prepare separate Mission Data Sets for AN/APR-39A (V) 1 equipped aircraft which are operationally active in the mission area of interest. Additional support functions include establishment of a filter to trap all Tactical Electronic Intelligence (TACELINT) related to the area; monitoring of constant-source traffic applicable to the mission area for all applications that affect U.S. Army systems; mission coordination meetings; and conduct of reprogramming operations in coordination with the JCEWR community. POCS are LTC Bert Napoleon/Mr.Norm Svarrer, DSN: 872-8899/2166.

ARAT-TA PERSONNEL RECOGNIZED!

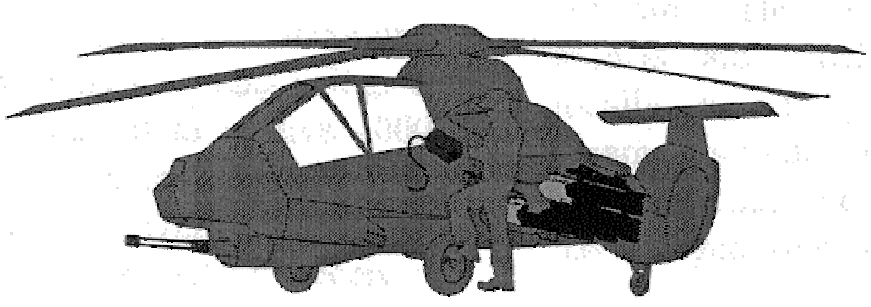
SSG Roy Williams, assigned to the ARAT-TA, Eglin AFB, Florida, was recently singled out to receive an Air Force award. He was selected by the Air Warfare Center 68th Electronic Combat Group (68th ECG) for the Best Of The Best Award. This award is part of a program established several years ago which recognizes the efforts of "teams" as well as individuals who have done outstanding work in support of the mission. Each quarter, the 68th ECG selects only four individuals or teams for recognition. SSG Williams' selection over qualified Air Force personnel is indicative of the high caliber of personnel assigned to the ARAT-TA. Congratulations to SSG Williams for a job well done! POC is LTC Bert Napoleon, DSN: 872-8899/2166.

MLVs - Memory Loader/Verifiers

(First In A Series Of Articles)

In order for software reprogramming changes to be introduced into current and near-term Army Target Sensing Systems (ATSS) at the field level, memory loading equipment, frequently referred to as Memory Loader/Verifiers (MLVs), must be procured. For the past two years, the Army (Target Sensing Systems) Rapid Reprogramming Project Office (ARAT-PO) has been investigating two types of data loading equipment to support this rapid reprogramming effort. These are In-Circuit Programmers and Memory Loader Verifiers (MLVs). Although In-Circuit Programmers support reprogramming of some Army systems in the field, MLVs appear to offer a better time and cost-effective solution to meet the Army's rapid reprogramming requirements.

Based on ATSS rapid reprogramming requirements, ARAT-PO has identified five desirable characteristics for Army MLVs. These are that MLVs should: (1) function as a dedicated data loader and not be used for purposes that could limit its availability when needed; (2) have broad loading functionality to support a variety of current and future platforms and systems (to include MIL-STD-1553B, RS-232C and RS-422 interfaces as well as MIL-STD-2217 [Appendix B] protocols); (3) have a simple interface that will reduce confusion and promote ease of use by operators; (4) be low-cost, lightweight, and suitably rugged for field use, and (5) have an option for battery power.



The first MLVs produced were universal systems designed to support unique protocols and interfaces for reprogrammable military systems. These systems were large, approximately 65 pounds, cost over $60K, and were used by the Air Force and the Navy in reasonably pristine environments. As it became apparent that these universal MLVs were not a cost-effective solution, MLV development took two different directions: multifunctional MLVs and dedicated loaders.

Multifunctional MLVs were designed to save money by reducing the amount of equipment required in the field. By supporting many tasks (one of which was memory loading/verifying), these types of MLVs could also perform as test sets, communications devices, or other required maintenance equipment. Commercial manufacturers have produced PC-based systems to satisfy some MLV requirements for less than $30K.

Dedicated loaders were intended to be lightweight, simple MLVs which could provide an inexpensive alternative to the universal MLVs. The Navy initiated effort in this area by funding development of the Rapid Reprogramming Terminal (RRT). This dedicated loader was designed to be used by all reprogrammable Navy systems. After commercial manufacturers understood the potential market for the RRT, they entered the market with their own dedicated loaders at a price below $15K.

Future articles will discuss in-depth how MLVs work and further detail Army efforts to acquire MLVs for the reprogramming effort. POCs are Mr. Sok Kim/Mr. Jon Cory, DSN: 992-1337.

FLAGGING

Flagging:

"Something That Is Used Like A Flag To Signal Or Attract Attention"

-Webster

The term "flag", as used by the Army Reprogramming Analysis Team (ARAT), refers to an indication that an Army Target Sensing System (ATSS) cannot identify or counter a threat. A flagging model is an electronic model that serves as an information filter. The task of the ARAT is to identify differences between the threat and threat data in the ATSS and analyze the impact of these differences. The model will go through incoming information and analyze the difference between threat emitter information (parameters) programmed into the ATSS and the threat emitter parameters as reported by various collectors.

The volume of incoming information can be staggering. It is not unusual to receive 4000 messages per shift during a "full up" exercise. During one recent exercise, the ARAT received 80,000 Tactical Electronic Intelligence (TACELINT) and text messages in a little over two weeks. The ultimate purpose of the flagging model, considering the amount of information that needs to be reviewed by the analyst, is to reduce the time required to detect threat changes. The flagging model, therefore, becomes the primary tool for reducing the volume of message traffic/information. Simply stated, the flagging model detects the parameters of concern and separates them from the overall traffic/information, highlighting their information for the ARAT engineers and analysts.

There are two basic types of flags, conventional models and Selectively Improved Flagging Techniques (SIFT). Both identify the difference between the threat and the information programmed into the ATSS. Conventional models compare summarized signal parameters to a systems programmed signal parameters. The conventional model attempts to identify system anomalies due to threat parameter change. The ultimate purpose of the flag is to reduce the time required to detect threat changes. The more sophisticated conventional models make the parameter comparison using the same logic as the U.S. systems' software. The more simplistic models are usually prepared locally and simply look at the parameters to determine if there is a difference (i.e., the number has changed from 340 to 350).

The SIFT model was devised to better support the effectiveness, reliability and maintainability of USAF aircraft target sensing systems, primarily directed at radar warning receiver and jammer software. SIFT is a software package which emulates the ATSS microprocessor and stimulates the hardware process of the respective system being modeled. The SIFT model is quite sophisticated. It requires pulse level intelligence information to operate. The pulse level intelligence information is passed off the SIFT model which executes the same software processes and uses the same threat data installed in the fielded system. The SIFT model then compares the result of the process to determine what response will be displayed or completed by the ATSS.

At present, the Army does not have sophisticated conventional and SIFT flagging in place. We do use locally prepared conventional flags, but these are simple parameter checkers that cannot emulate the ATSS software. The impact of not having a Flagging capability for ATSS is a manual manipulation of the data selected by the locally produced parameter checkers. Manual manipulation of parametric data is labor intensive and time consuming. The ARAT is working on defining the requirement for flagging models for the reprogrammable ATSS. Since flagging is system specific, sources of funding will be pursued later in FY94. POCs are Mr. Ken Kragh, DSN: 992-1337/Mr. Norm Svarrer, DSN: 872-8899.

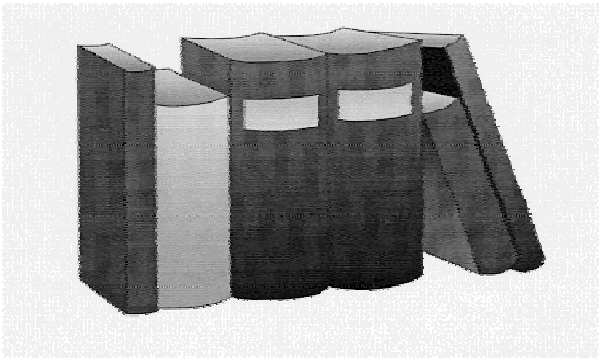
JULLS: Bettering The Future By Building On The Past

(First In A Series Of Articles)

"One must learn by doing the thing. The thing, though you think you know it, you have no certainty until you try."

-Sophocles

One of the inherent benefits of doing something is the knowledge we gain from the experience. This knowledge gives us the ability to evaluate our experience, decide how to do it better or differently the next time, address or correct difficulties we encountered, and share with others what has been done exceptionally well. The ARAT community is no exception. We must also document what we have learned in exercises or "real world" operations so that we can improve upon these accomplishments as well as set objectives for the future. The Army (Target Sensing Systems) Rapid Reprogramming Project Office (ARAT-PO) has initiated development of an Army Rapid Reprogramming Lessons Learned Data Base. This data base will be constructed from the Joint Universal Lessons Learned System (JULLS).



Simply stated, JULLS is a software application and resultant data base used to maintain lessons learned on subjects of interest to the joint military community. The JULLS software program and resultant Master Data Base are maintained by the Joint Center for Lessons Learned (JCLL) found within the office of the Evaluation and Analysis Division, Directorate of Operational Plans and Interoperability, located at J-7 in the Pentagon. The data base is designed to be a library of "knowledge and experience" and is "intended to cover all aspects of military operations and training exercises." JULLS is a dynamic system with new information being added as it develops. If properly used, it can become the first place to look for information you might want related to virtually any military subject.

The catalyst for JULLS is "lessons learned". According to Joint Publication 1-03.30, "Joint After-Action Reporting System", lessons learned can consist of: a successful action that should be noted for future operations or exercises; a problem encountered that had joint level significance and the positive actions taken by participants to bypass or alleviate that problem; or a problem that was encountered for which no solution was found.

This last condition is of particular importance. Lessons can be learned regardless of whether or not a solution was found. The absence of a solution identifies a gap in the Army's or even the Joint, reprogramming process. This annotated gap can generate a review of the JULLS Master Data Base to see if the problem was encountered before and if a viable solution was found at that time. If no solution was previously developed, this gap can be the basis for a formalized needs requirement, with follow-on discussion, analysis, and eventual resolution.

An important consideration is to define what constitutes a problem of joint level significance. Within the ARAT community, especially at the user level, it is sometimes difficult to determine whether a problem, solution, etc. is of Joint significance or not. For the majority of the ARAT community, that should not be a concern. Various levels in the chain of command will make that determination. What is of importance to the ARAT community is that lessons learned are documented

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JULLS (continued)

and forwarded to the ARAT-PO. Even if they do not reach the Joint Master Data Base, they will be retained in the Army Rapid Reprogramming Lessons Learned Data Base for future use.

The ARAT-PO is currently developing the Army Rapid Reprogramming Lessons Learned Data Base at Fort Monmouth, NJ. It has taken the initiative to develop this data base in order to maintain all Army reprogramming lessons learned. The data base will be comprised of Army JULLS submissions from previous exercises and operations as well as pertinent lessons learned by the joint reprogramming community. The Project Office is in the process of obtaining the JULLS Master Data Base and subsequent updates from the JCLL.

This data base will be used to save the ARAT program time and money. It will allow the ARAT-PO to search for solutions to problems before investing in analysis/resolution; identify gaps in the ARAT process; identify areas of ARAT which work well (and those that don't) for project assessment; build future objectives based on positive and negative aspects of the project; build future exercise objectives; and obtain feedback from all of the ARAT community.

JULLS is a double-edged sword. One is narration of the lessons learned. The other is the Remedial Action Management Program or RAP. In addition to the data base, the Project Office will also manage the RAP. RAP provides the process behind a "yes" answer to the question "Is there some formal action that will fix the problem?" RAP is used by the originators of lessons learned, or the Project Office, to assign action officers, develop milestones and guide resolutions to lessons learned which require solutions.

Part Two in this series on JULLS will examine intricacies of the JULLS narrative and the RAP. Remember, we learn by doing, and the knowledge we gain should guide our future. POCs are Mr. Sok Kim/Mr. Tom Hanlon; DSN: 992-1337.

"ARAT BULLETIN" will be published quarterly. It is intended to provide the ARAT community with current information. You are invited to submit input for improving this publication. Also if you have an article of interest for publication, fax it to the Editor at (908) 532-5238. Include your name, telephone number and source of information.

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